DOE/NPOSR-CUW--9800474G

Naval Petroleum Reserve No. 3

SITE ENVIRONMENTAL REPORT

CY 1997

Responsible Government Agency:

U.S. Department of Energy
Naval Petroleum & Oil Shale Reserves
in
Colorado, Utah and Wyoming
907 N. Poplar, Suite 150
Casper, Wyoming 82601

Prepared by

FLUOR DANIEL

Fluor Daniel (NPOSR), Inc.

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Acronyms and Abbreviations

bbl	Barrel (42 US Gallons)
CAA	Clean Air Act
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CESQG	Conditionally Exempt Small Quantity Generator
CFR	Code of Federal Regulations
COD	Chemical Oxygen Demand
CWA	Clean Water Act
DMR	Discharge Monitoring Report
DOE	Department of Energy
EA	Environmental Assessment
EPA	Environmental Protection Agency
ESA	Endangered Species Act
ES&H	Environment, Safety and Health
FD	Fluor Daniel (NPOSR)
FIFRA	Federal Insecticide, Fungicide, Rodenticide Act
LTS	Low Temperature Separation
NEESA	Naval Energy and Environmental Support Activity
NEPA	National Environmental Policy Act
NGL	Natural Gas Liquids
NHPA	National Historical Preservation Act
NPOSR-CUW	Naval Petroleum and Oil Shale Reserves - Colorado, Utah, and Wyoming
NPR-3	Naval Petroleum Reserve No. 3
NPDES	National Pollutant Discharge Elimination System
NORM	Naturally Occurring Radioactive Material
ppm	Parts Per Million
PA	Preliminary Assessment
PCB	Polychlorinated Biphenyls
PSD	Prevention of Significant Deterioration
RCRA	Resource Conservation and Recovery Act
RQ	Reportable Quantity
SARA	Superfund Amendments Reauthorization Act
SDWA	Safe Drinking Water Act
SPCC	Spill Prevention Control and Countermeasure
TCLP	Toxicity Characteristic Leaching Procedure
TOX	Total Organic Halogens
TQM	Total Quality Management
TSCA	Toxic Substances Control Act
UIC	Underground Injection Control
USDW	Underground Source of Drinking Water
UST	Underground Storage Tank
WYDEQ	Wyoming Department of Environmental Quality
WYOGCC	Wyoming Oil and Gas Conservation Commission

I. EXECUTIVE SUMMARY

The CY 1997 Site Environmental Report and Compliance Summary discusses environmental compliance activity for NPR-3 from January 1997 through December 1997.

The Title V permit application submitted to WYDEQ in September of 1995 under the Clean Air Act Amendments of 1990 has been deemed administratively complete and is currently undergoing technical review. The permit was modified in February 1997 to include an amine reboiler constructed in 1996 at the LTS gas plant and the elimination of one of the steam generators utilized for secondary recovery of oil at NPR-3. The remaining steam generators in the permit are idled at this time.

All hazardous wastes are stored in a hazardous waste accumulation area which is fenced, locked and secure when activity is not taking place. Administrative procedures for operation of the facility are in place. NPR-3 maintains its status as a conditionally exempt small quantity generator (CESQG).

Hydrogen sulfide flares did not operate at NPR-3 in 1997. H_2S monitoring around tank batteries with the potential to flare H_2S indicates readings well below the WYDEQ limit of $40\mu g/m^3$. Prior to installation of the flares, the average 30-minute reading was between $660\mu g/m^3$ and $1100\mu g/m^3$. However, due to declining production, H_2S concentrations have dramatically decreased.

Integrity testing on the three underground storage tanks, including line tightness testing was conducted in July 1997 satisfying the annual WYDEQ leak detection requirements. Leaks were not detected by the analysis.

NPDES wastewater samples collected at NPR-3 were in compliance with WYDEQ standards. There were no spills or leaks reportable under CERCLA.

There is no underground source of drinking water (USDW) underlying NPR-3.

II. INTRODUCTION

Naval Petroleum Reserve No. 3 (NPR-3), Teapot Dome, consists of 9,481 acres (38.4 km^2) located 35 miles (56 km) north of Casper, Wyoming. The geologic structure of NPR-3 is the southernmost of two adjacent oil-bearing domes lying in the same anticline. Eleven oil-bearing zones are known to exist within the geologic formations underlying NPR-3. The reserve extends approximately 7 miles (11 km) along a north-south axis and 2 miles (3 km) along an east-west axis. The elevation of NPR-3 is about 5,400 feet (1,650 m) above sea level, and the terrain is characterized by rolling plains interspersed with ridges and isolated bluffs. The surface consists of a prairie dotted with sagebrush, severely cut ravines, and sandstone bluffs.

NPR-3 is part of the Powder River Drainage Basin and is drained by two streams, Little Teapot Creek and Teapot Creek, which join and flow into Salt Creek just north of the Reserve. Prior to the production of oil and gas from the Reserve, the area was used for livestock grazing. Annual precipitation is 9-12 inches (23 - 30 cm). Temperatures for the area can vary from highs of 100°F (38° C) during the summer months to lows during the winter of -40°F (-40°C). The average date for the occurrence of the last frost is May 18, while the average date of the first freeze is September 25. NPR-3 soils are sandy clay loam. Bentonite soils can be found in parts of the field. Figure 1 shows the geographical location of NPR-3.

Production facilities include pumping units, treaters, tanks for storage of petroleum and produced water, low-temperature-separation gas plant, water injection facilities, waste water disposal system, water treatment facility, steam generation-injection systems, and flowlines. In addition, there are numerous support facilities, including: electric power distribution systems; cathodic protection systems; potable water and sewer systems; roads, bridges and fences; buildings for maintenance, production support, administration, safety, security and environmental.

Water produced in conjunction with the operation of the field is discharged to local drainages in accordance with NPDES permits from the Wyoming Department of Environmental Quality (WYDEQ). Permits are also in place for the disposal of waste water from steamflood operations into injection wells permitted by the Wyoming Oil and Gas Conservation Commission (WYOGCC). Potable water is hauled to the reserve by truck from the neighboring community of Midwest. An average of 50 contractor personnel were employed in the field during 1996 and an average of 20 in the Casper office. Figure 2 shows the major facilities at NPR-3.

Figure 1

NPR-3 Geographic Location

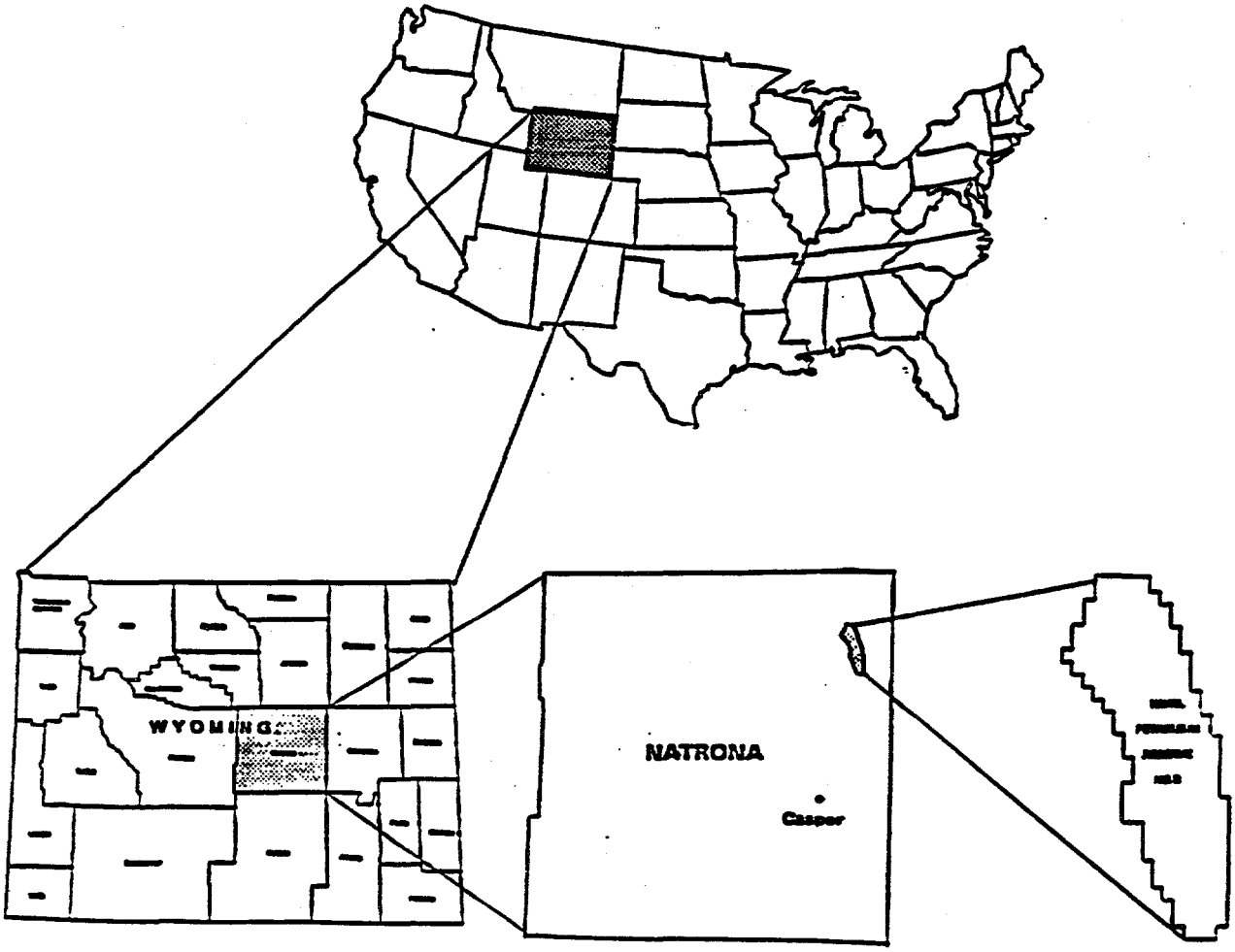
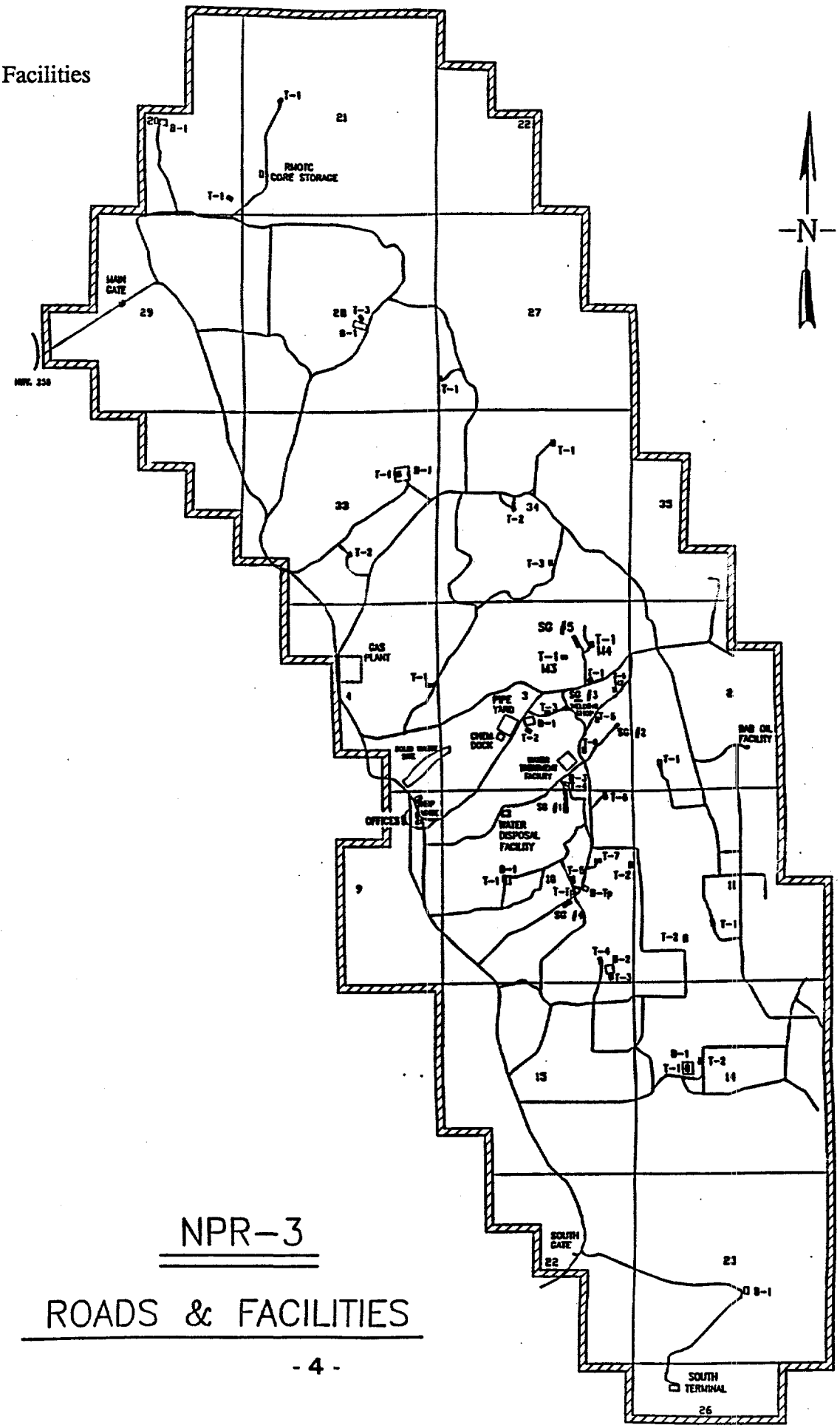


Figure 2

NPR-3 Roads and Facilities



III. COMPLIANCE SUMMARY

A. Clean Air Act (CAA)

Air emissions are regulated under the CAA (42 USC 7401 through 7642). EPA regulations are contained in 40 CFR Parts 50 through 87 and 29 CFR Part 1910. Wyoming regulates air quality through the Rules and Regulations of the WYDEQ, Air Quality Division, Chapter 1, Wyoming Air Quality Standards and Regulations.

NPR-3 currently holds construction permits for the LTS Gas Plant, its associated flare and amine reboiler, and Steam Generators 1, 2, 3, 4 and 5. Of the five steam generators, steam generator 2 has been removed from the Title V permit and 1,2,3 and 4 have been shut down.

Hydrogen sulfide gas was flared at NPR-3 between November 1992 and the first quarter of 1995. Since the first quarter of 1995 H_2S flares have not operated and operating permits for the flares have never been required by WYDEQ for NPR-3. However, an emissions survey was conducted in May 1994 and included investigation into H_2S concentrations. The survey consisted of representative wells and tanks and the three H_2S flares. Effluent samples were collected and also analyzed for C1-C10 and BTEX.

Sampling of ambient H_2S at the appropriate tank batteries was conducted monthly in 1997 and continues. The ambient readings are taken using a Jerome 631-X H_2S analyzer at points around the batteries which were relative to those used for sampling prior to flare installation. Summaries of sampling data can be found in the section on Environmental Non-Radiological Program Information.

B. Clean Water Act (CWA)

Wyoming is a NPDES authorized state and wastewater discharges are regulated under the CWA (33 USC 1251 to 1387) and its associated EPA regulations (40 CFR Parts 122, 136, 403, and 405-471). Wyoming regulations are codified under the Wyoming Water Quality Rules and Regulations (Chapters I, II, IV, VII, VIII, and IX).

1. Wastewater Discharges

During 1997, NPR-3 held twelve National Pollutant Discharge Elimination System (NPDES) permits, issued by WYDEQ. Four of these permits were discontinued. See Table 1 for a listing of NPDES permits. These permits are for outfalls at tank batteries, the North Waterflood Pump Building, the Water Disposal Facility, Steam Generators 2, 3, 4, and 5, and the Water Treatment Facility. The NPDES permits impose discharge limits on oil and grease, conductivity, and chemical oxygen demand. All outfalls must be monitored for these parameters bimonthly. Only one outfall discharged during 1997; the B-Tp-10 tank battery. The remaining permits did not discharge. Sampling indicated compliance with NPDES permit limits. During January and July 1997,

the semi-annual discharge monitoring reports (DMR's) were filed with WYDEQ and EPA as required.

Sanitary wastewater from the Main Office complex, LTS Gas Plant Complex, Quonset Warehouse, the Lower Office, Shop Building, and the Water Treatment Facility is treated using septic tanks and leach fields. Each complex has a 1000-gallon (3.8-m^3) septic tank constructed of either steel or concrete. Construction permits for each were obtained by the Natrona County Health Department.

2. Biotreatment Facility

On October 24, 1996, NPOSR-CUW was awarded the Office of Fossil Energy Environment, Safety and Health (FE ES&H) Achievement Award for the design, construction and operation of a Biotreatment Facility that uses an organic process to clean produced water of hydrocarbons and reduces chemical oxygen demand. This allows produced water to be discharged rather than injected into underground reservoirs.

In January 1996, the Biotreatment Facility constructed adjacent to the B-Tp-10 tank battery began treating produced water. The project was constructed at the discharging outfall for the majority of produced water at NPR-3. This system is the final process for waste water treatment under an issued NPDES permit allowed by the Clean Water Act. The facility consists of a mixing and skimming pit, cooling trench, aeration stairstep and surface flow wetland. The wetland contains a growth of emergent wetland plants.

The process naturally cleans produced water from field production facilities by utilizing algae, bacteria, and plants. Water discharges from the existing B-Tp-10 pit (used as a skimming and mixing pond) through a cooling canal on the northern boundary of the pit designed to cool the produced water. Produced water then flows through a series of stair-steps for aeration and further cooling, finally reaching the Biotreatment Facility wetland. The water then discharges from the wetland into a lagoon and finally into an unnamed tributary to Little Teapot Creek (the original receiving waters for the B-Tp-10 discharge).

This process allows all produced water from the NPR-3 oilfield to be discharged. The project is beneficial to the oil industry and to the environment as a whole by lowering costs per barrel of oil produced. Prior to the Biotreatment Facility, 10,000 barrels of waste water were injected per day at a cost of $180,000 per year. This project also provides wetland habitat and more flowing water for fisheries, livestock, wildlife and NPR-3's neighboring ranchers. The NPDES discharge parameters have consistently been met after treatment at the Biotreatment Facility.

In 1996, the Biotreatment Facility was featured in each of the following periodicals: *Office of Fossil Energy's EH&H Pipeline Newsletter, DOE This Month, E&P Environment, and the Oil and Gas Journal.*

3. Petroleum Management

Petroleum discharges are regulated under the CWA. EPA regulations are codified in 40 CFR Parts 110, 112, 280, 300, and 302. Wyoming regulations concerning the discharge of oil into waters of the State are codified in Water Quality Rules and Regulations Chapter VII. WYDEQ has also prepared a "Wyoming Oil and Hazardous Substances Pollution Contingency Plan."

Petroleum management at NPR-3 consists of the management of oil and wastes associated with oil production (e.g., produced water, sludges) to prevent oil from being discharged into surface water. Oil spill prevention measures are outlined in the Naval Petroleum Reserve No. 3 Spill Prevention Control and Countermeasure (SPCC) Plan. NPR-3 has numerous potential sources for crude oil spills, including tank batteries, test satellites, pipelines, reserve pits and the South Terminal Battery. Earthen retaining pits used to store produced water are permitted by the WYOGCC.

Petroleum management also includes the land application of crude oil sludge on NPR-3 roads for dust suppression. Each spring, a permit application is submitted to WYDEQ for the following summer and fall. Stipulations usually include analysis of the sludge for pH, benzene, Radium 226, and occasionally a requirement to perform the Toxicity Characteristics Leachate Procedure (TCLP) for TOX (Total Organic Halogens) and metals.

Occasionally WYDEQ requires a sampling program to evaluate treated roads. This process determines the cumulative impact road application has on the roadbase. This study was required in 1997 and indicated no accumulation had occurred. Approved EPA laboratory methods identical to those listed above are utilized. All land application permits expire on November 1.

C. Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) Issues

DOE sites have been required under CERCLA and DOE Order 5480.14 to develop and implement a program to identify and evaluate inactive hazardous waste disposal sites to determine the necessity of remediation. The CERCLA Phase I Assessment for NPR-3 was completed in May 1987.

1. CERCLA Reportable Releases

Hazardous substances are stored throughout NPR-3 and NOSR-3 in small quantities to support operations. In most cases, substances are maintained at individual sites in quantities less than a reportable quantity (RQ). During 1997, there were no spills or leaks reportable under CERCLA.

D. Emergency Planning and Community Right-To-Know Act (EPCRA)

The Emergency Planning and Community Right-to-Know Act (42 USC 11001 through 11050) imposes reporting requirements for hazardous chemicals. This act appears as Title III of the Superfund Amendments Reauthorization Act (SARA) and is often referred to as SARA Title III. EPA reporting requirements are codified in 40 CFR Parts 350, 355, 370 and 372.

1. Title III Reporting

NPR-3 is under the jurisdiction of the Wyoming Emergency Management Agency located in Cheyenne and the Natrona County Emergency Management Agency located in Casper. Emergency assistance is available through the Natrona County and Midwest/Edgerton Fire Departments.

No emergency notifications under SARA Section 304 (40 CFR 355.40) were required at NPR-3. Tier Two Emergency and Hazardous Chemical Inventory forms were submitted in February 1997. Additionally, as a result of Executive Order 12856, all DOE facilities are required to participate in Toxic Release Inventory (TRI) reporting, regardless of Standard Industrial Code. NPR-3 reported for the fourth time in 1997.

E. Endangered Species Act (ESA)

To ensure that federal actions are not likely to jeopardize the continued existence of an endangered or threatened species, regulatory protection is provided under Section 7 of the Endangered Species Act (ESA) of 1973 (16 USC. 1536). During 1996, NPR-3 activities have not effected endangered or threatened species. A survey for an endangered plant, the Ute ladies' tresses (Spiranthanthes diluvialis) was conducted in August 1997. No plants were found.

F. Federal Insecticide, Fungicide, Rodenticide Act (FIFRA)

1. Pesticides Management

Pesticides are regulated under FIFRA [USC 136 through 136(y)]. EPA pesticide regulations are codified in 40 CFR Parts 162, 165, 166, and 171.

Only household-type spray insecticides and rodenticides, such as D-Con, are currently stored at NPR-3. Spray insecticides are used to control black widow spiders in outbuildings. Relatively small quantities of these pesticides are stored at a central storage area at the warehouse.

Beginning in 1994, NPR-3 changed its policy on herbicide usage. Operation employees received pesticide application licenses and began spraying herbicides rather than relying on commercial applicators. This has resulted in substantial cost savings for the project. Two herbicides were used in 1997 to clear vegetation around wells and

production equipment to reduce fire danger. These chemicals were selected in consultation with the University of Wyoming's Plant Sciences Department and approved by the BLM. The herbicides Krovar and Esteron 99 provide two years of growth inhibition. Herbicides are stored in a secure, fenced area and are used in accordance with a 1990 herbicide/pesticide management plan.

G. Floodplain/Wetlands Assessments

Two Executive Orders (E.O. 11988 Floodplain Management and E.O. 11990 Protection of Wetlands) require Federal agencies to consider the effects of proposed actions on floodplains and wetlands. During 1997, NPR-3 construction/production activities have not effected floodplains/wetlands.

H. National Historic Preservation Act (NHPA)

The following is a listing of laws, one Executive Order, and a Presidential Memorandum that provide guidance for the protection of archaeological and historic resources:

- Antiquities Act of 1906 (P.L. 59-209);
- Historic Sites, Buildings, and Antiquities Act of 1935, P.L. 74-292, as amended by P.L. 89-249, P.L. 96-625;
- Archaeological Recovery Act of 1960, P.L. 86-523, as amended by P.L. 93-291 (The Archaeological and Historic Preservation Act of 1974), P.L. 95-625, P.L. 96-205, and P.L. 96-515;
- National Historic Preservation Act of 1966, P.L. 89-665, as amended by P.L. 91-243, P.L. 93-54, P.L. 94-422, P.L. 94-458, P.L. 96-199, P.L. 96-244, and P.L. 96-515, P.L. 98-483, and P.L. 101-70;
- Executive Order 11593 (1971);
- President's Memorandum on Environmental Quality and Water Resources Management (1978);
- Archaeological Resources Protection Act of 1979, P.L. 96-95, as amended by P.L. 100-555 and P.L. 100-588; and
- Native American Graves Protection and Repatriation Act of 1990 (P.L. 101-601, 25 U.S.C. 3001-3013).

A sitewide Cultural Resource inventory was completed in July of 1995 as a response to comments from the Wyoming SHPO regarding the revised NPR-3 EA. Only a few sites eligible for NRHP listing were located, and these sites are avoided.

I. Resource Conservation and Recovery Act (RCRA)

Hazardous wastes are regulated under RCRA [42 United States Code (USC) 6901 to 699li]. EPA's hazardous waste regulations are codified in 40 Code of Federal Regulations (CFR) Parts 260 through 271.

1. Hazardous Waste Management

During 1991, a hazardous waste storage area was established at NPR-3. The area is fenced to provide security and insure that unauthorized personnel are kept out. Management procedures for the handling and storage of hazardous waste have been implemented.

NPR-3 maintains its status as a conditionally exempt small quantity generator (CESQG), generating < 200 kg of hazardous waste annually. Wastes are produced from equipment maintenance, grind-out (centrifuge) testing, and spillage of materials in storage. Small amounts of other hazardous wastes (e.g., paint residues, lithium and nickel/cadmium batteries) are also generated. NPR-3 retains the permit issued in 1990 when the facility was a small quantity generator. The NPR-3 EPA identification number for this permit is WY4890090042.

2. Solid Waste Management

RCRA also governs the management of solid waste. EPA's solid waste regulations are codified in 40 CFR Parts 240 through 246. Wyoming's solid waste regulations are codified under the Waste Management Division Rules and Regulations, Chapter I, II, VII, VIII, and IX.

NPR-3 operates an industrial solid waste landfill permitted by the Wyoming Department of Environmental Quality (WYDEQ). In November of 1996, NPR-3 contract personnel began preparing the required four (4) year renewal application for submittal to WYDEQ for evaluation. The process continued through 1997 and the permit was renewed by the WYDEQ on January 28, 1998.

The landfill has received waste from NPR-3 operations, including office waste, food scraps, trash, spent iron sponge, dried glycol filters, and other wastes on a case-by-case basis with DEQ approval. In October 1993, a commercial Waste Disposal Firm (BFI) was contracted to provide solid waste disposal. The majority of solid waste produced at NPR-3 is now transported to the Casper City Balefill. The NPR-3 landfill remains in use for large-quantity wastes that are not economic to commercially handle. The site recycled scrap metal and aluminum during 1997.

3. Underground Storage Tanks (UST)

Underground storage tanks containing petroleum and hazardous substances are regulated under RCRA. Hazardous substances are designated under 40 CFR Part 302. EPA regulations for USTs are codified in 40 CFR Parts 280 and 281.

NPR-3 currently has three WYDEQ-permitted underground storage tanks in service: one 4,000-gallon (15.1 m^3) capacity diesel, one 4,000-gallon (15.1 m^3) capacity

unleaded gasoline, and one 2,000- gallon (7.2 m^3) unleaded gasoline. Integrity testing was conducted on the tanks in July 1997 (for 1997 requirements) and indicated that there were no leaks in the tanks or the piping system. Currently the storage tanks and piping are cathodically protected using sacrificial anodes. During 1994 the tanks were partially upgraded to 1998 standards by the installation of automatic shut-off valves. Catchment basins for spill and overfill protection were installed in 1996. The drip tanks associated with flowlines are exempted from the definition of a UST under 40 CFR 280.12.

J. Safe Drinking Water Act (SDWA)

1. Drinking Water

Drinking water is regulated under the SDWA (42 USC 300f through 300j-11). Regulations promulgated pursuant to the SDWA are codified in 40 CFR Parts 141 through 143.

Potable water for NPR-3 is transported by truck from an EPA-approved water source (the town of Midwest, WY), which acquires its water from the Casper Municipal Water System via a pipeline. Four buried cisterns are used to store potable water at the site: two 1,000-gallon (3.8 m^3) tanks at the LTS Gas Plant, a 7,500-gallon (28.4 m^3) tank at the Lower Office Complex, and a 1,000-gallon (3.8 m^3) tank at the Water Treatment Facility. Liquid chlorine bleach is added during each delivery. The EPA has determined that NPR-3 is a non-transient, non-community public drinking water supply. EPA requires the drinking water at NPR-3 to be sampled quarterly for total coliform bacteria.

Recently semi-annual sampling for lead and copper was required. Sampling began in 1994 when NPR-3 water analyses showed an exceedance of the 90th percentile limits for both lead and copper. The 90th percentile for lead at NPR-3 was 0.030 μg/L with a limit of 0.015 μg/L, and that for copper was 1.39 mg/L with a limit of 1.3 mg/L. NPR-3 is currently analyzing its potable water for water quality parameters (pH, conductivity, calcium). At EPA's direction, no further monitoring for lead and copper will be conducted until the EPA develops a corrosion control plan for NPR-3.

2. Underground Injection Control (UIC)

Underground injection is regulated under the SDWA. EPA regulations are codified in 40 CFR Parts 144 through 147 and Part 149. Class II wells are regulated in Wyoming by the Wyoming Oil and Gas Conservation Commission (WYOGCC) Rules and Regulations.

NPR-3 holds UIC permits issued by the WYOGCC for five water disposal wells. Three of these wells are currently being operated to dispose of produced water from the Shannon, Second Wall Creek, Third Wall Creek, Muddy, and Dakota formations into the Crow Mountain formation. The permits establish injection pressure limits, indicate what fluids are

acceptable for injection and require monitoring and reporting. NPR-3 was granted a variance from the monthly reporting requirements (Form 16A) on February 7, 1990. Monthly reports are now only made on Form 2, as required by WYOGCC Rule 313. NPR-3 submits these forms for all oil, water, and gas production wells and injection wells.

NPR-3 also operates approximately 23 water and steam injection wells for enhanced oil recovery. These wells are also permitted by the WYOGCC under the UIC program.

K. State Oil and Gas Regulations

Oil and gas regulations are administered in Wyoming by the Wyoming Oil and Gas Conservation Commission (WYOGCC).

Underground Injection Control (UIC) permits and the plugging and abandonment (P&A) of wells are governed by WYOGCC rules and regulations. In 1995, a P&A plan was developed which prioritized 25 of the highest ranking wells which need to be plugged & abandoned due to environmental, safety, mechanical or economic conditions.

Pits are fenced and flagged to restrict wildlife access. Three pits are now netted to prevent access by waterfowl and other birds. Other pits are being evaluated to determine if netting is necessary. Unneeded pits are closed. Additional activities include the regular inspection of production facilities to insure regulatory compliance with WYOGCC regulations.

L. Toxic Substance Control Act (TSCA)

1. PCB Management

Polychlorinated biphenyls (PCBs) are regulated under TSCA (15 USC 2601 to 2654). EPA regulations regarding the production, use, storage, handling, and disposal of PCBs are codified in 40 CFR Part 761.

All known PCB-contaminated electrical equipment at NPR-3 was removed in 1993. Lab testing of transformers is still done to document their regulatory status. Electricians occasionally discover small capacitors, which may contain PCBs. Disposal of PCB-contaminated capacitors is handled by a licensed agent.

M. National Environmental Policy Act (NEPA)

NEPA ensures that major federal actions do not significantly impact the environment by requiring all federal actions be evaluated for potential environmental impacts (42 USC 4321-4347 as amended). DOE implementing regulations are codified under 10 CFR Part 1021.

NPR-3 is currently operating under an approved environmental assessment (EA). A sitewide EA for the continued development of NPR-3 was completed, reviewed, and approved in 1995.

N. Other Major Environmental Issues and Actions

To provide additional protection for birds and other wildlife, NPR-3 has begun a process of reviewing produced water pits and closing or netting them as appropriate. Pits are netted in order of those posing the greatest potential threat. During 1994, the B-TP-10 pit was covered with 1½ inch netting, pit B-1-3 was netted in July of 1995, the B-1-10 pit in July 1996 and the water disposal facility pit in 1997. During 1997, 4 pits were backfilled, 9 pits were reseeded, and 9 pits received final approval of pit closure from the Wyoming Oil and Gas Conservation Commission. All other pits at NPR-3 are flagged and fenced to discourage entry by wildlife.

During 1997, no penalties or violations were levied against NPR-3.

O. Summary of Environmental Permits

Table 1 presents information regarding environmental permits at NPR-3.

Table 1
NPR-3 Permits

Item	Permit No.	Facility	Permitting Information
Air Quality	30-092 (Title V)	NPR-3	(AR) - When permit is granted
	CT-360	LTS Heat Medium Heater	(AR) - April 15
	CT-361A	LTS Smokeless Flare	(AR) - April 15
	CT-1202	LTS Gas Plant Amine Reboiler	(AR) - April 15
	CT-361A-2	50 MMBtu/hr Steam Gen. No. 1*	(AR) - April 15
	CT-778	50 MMBtu/hr Steam Gen. No. 2*	(AR) - April 15
	CT-850	50 MMBtu/hr Steam Gen. No. 3*	(AR) - April 15
	CT-874	50 MMBtu/hr Steam Gen. No. 4*	(AR) - April 15
	CT-937	50 MMBtu/hr Steam Gen. No. 5*	(AR) - April 15
NPDES	WY-0028894	B-1-3 Tank Battery	(SAR) (PR 12-31-2000)
	WY-0028908	B-1-10 Tank Battery	(SAR) (PR 12-31-2000)
	WY-0028274	B-TP-10 Tank Battery	(SAR) (PR 12-31-2000)
	WY-0028916	B-1-28 Tank Battery	(SAR) (PR 12-31-2000)
	WY-0028924	B-1-33 Tank Battery	(SAR) (PR 12-31-2000)
	WY-0032115	Water Disposal Facility	(SAR) (PR 12-31-2000)
	WY-0034029	~~Steam Generator No. 2~~ Closed out	(SAR) (PR 2-28-98)
	WY-0034495	~~Steam Generator No. 3~~ Closed out	(SAR) (PR 2-28-98)
	WY-0035076	~~Steam Generator No. 4~~ Closed out	(SAR) (PR 2-28-98)
	WY-0035297	~~Steam Generator No. 5~~ Closed out	(SAR) (PR 2-28-98)
	WY-0034037	Water Treatment Facility	(SAR) (PR 2-28-98)
	WY-0034126	North Waterflood Floor Drains	(SAR) (PR 2-28-98)
Solid Waste	NPR-Ind #2	Landfill	(PR) Every four (4) years

Item	Permit No.	Facility	Permitting Information
Road Application	96-057	NPR-3 Roads (Field-wide)	As needed, generally annually
Ground Water Appropriation	UW-60713	B-1-3 Tank Battery	No annual report or permit renewal required
	UW-60714	B-1-10 Tank Battery	
	UW-60715	B-2-10 Tank Battery	
	UW-60716	B-TP-10 Tank Battery	
	UW-60717	B-1-14 Tank Battery	
	UW-60718	B-1-20 Tank Battery	
	UW-60719	B-1-28 Tank Battery	
	UW-60720	B-2-28 Tank Battery	
	UW-60721	B-1-33 Tank Battery	
	UW-60722	B-1-35 Tank Battery	
	UW-43810	17-WX-21 Madison Water Well	
	UW-85156	57-WX-3 Madison Water Well	
Underground Injection Control		124 Injection Wells	Integrity testing conducted on each well every 5 years
		34, 51 & 74-CMX-10 for Brine Disposal	
		86-LX-10, 25-LX-11, 14-LX-28	
Underground Storage Tanks	963-1	Diesel Storage Tank	(PR) Annual - July & (AR)
	963-2	Unleaded Gasoline Storage Tank	(PR) Annual - July & (AR)
	963-3	Unleaded Gasoline Storage Tank	(PR) Annual - July & (AR)
EPA Hazardous Waste ID No.	WY 4890090042	Hazardous Waste Disposal at NPR-3	No annual report required due to Conditionally Exempt Small Quantity Generator Status (CESQG)

Key: **(PR) Permit Renewal**
(AR) Annual Report
(SAR) Semi-Annual Report
*** Output capacity of 50 MMBtu/hr corresponds to 62.5 MMBtu/hr input capacity**

IV. Environmental Program Information

A. Environmental Compliance Assessment

1. Self-Assessment Program

Both DOE and FD have established Self-Assessment Programs which monitor environmental compliance with Federal, State and local laws and DOE Orders.

B. Environmental Training

During 1997, Environmental Department personnel attended the following training programs:

- 8-hour Hazardous Waste Site Worker Refresher

Environmental regulatory compliance training programs have been provided to contractor management and field staff by FD Environmental staff in the areas of Resource Conservation and Recovery Act, Clean Water Act, underground storage tanks, pit management and the National Historic Preservation Act.

V. Environmental Radiological Program Information

Regular radiological monitoring is not required in association with oil and gas production operations at NPR-3. However, the Wyoming Department of Environmental Quality, Water Quality Division has implemented a voluntary program for monitoring naturally occurring radioactive material (NORM) from produced oil field waters. The WYDEQ is primarily concerned with Radium 226 (Ra226) content. The discharge standard has been set at 60 pCi/L. Baseline data obtained during 1989 have indicated that produced waters at NPR-3 are well below the 60 pCi/L standard. However, monitoring of the only actively discharging NPDES point was completed during 1996 for Ra226. The results of the produced water Ra226 analysis conducted during 1997 are presented in Table 2.

To determine if pipe scale could possibly be a NORM source during pipe cleaning operations, the scale was analyzed (in 1989). Results of analysis indicated a Ra226 level of 12.3 pCi/L.

Table 2
Produced Water Analysis for Radium 226

NPDES Discharge Facility	Average Radium 226 (pCi/L)
B-TP-10	13.0 $\pm$1.0

VI. Environmental Non-Radiological Program Information

A. National Pollutant Discharge Elimination System (NPDES)

National Pollutant Discharge Elimination System (NPDES) permits are maintained for all facilities discharging produced waters. A WYDEQ, Water Quality Division annual inspection of NPR-3 NPDES facilities was conducted in October 1991. Results of the inspection indicated no violations. WYDEQ conduct an annual inspection in 1997. Samples taken indicated compliance with WYDEQ NPDES permit standards.

Parameters required and NPDES permits are presented in Table 3, and results of NPDES monitoring during 1997 re presented in Table 4. NPDES discharges at NPR-3 were in compliance with operating permit parameters in 1997

Although the parameters required to be tested by each NPDES permit varies, all facilities are tested for Oil and Grease, Chemical Oxygen Demand (COD), Conductivity, and pH, as shown in Table 4 below. Exceedances are reported to WYDEQ when a test exceeds the permitted requirements for that facility.

Table 3
Parameters Required By NPDES Permits

Facility	Oil &Grease, Radium 226	Oil &Grease, Conductivity, COD
	B-TP-10	Water Treatment Facility (WTF)
	B-1-3	North Waterflood Drain (NWFD)
	B-1-10	Steam Generator #2
	B-1-28	Steam Generator #3
	B-1-33	Steam Generator #4
	B-2-10	Steam Generator #5
	Water Disposal Facility (WDF)	

Table 4
NPDES Discharge Results
January 1, 1997 to December 31, 1997

Location	No. of Analyses	Conductivity			COD			O&G			pH		
		Low	High	Exc	Low	High	Exc	Low	High	Exc	Low	High	Exc
B-Tp-10	23	5570	7121	0	17	80	0	1.8	8.4	0	7.59	8.17	0

The following NPDES permitted facilities did not discharge in 1994:

B-1-3	B-1-28	SG No. 4	B-1-33
B-1-10	SG No. 2	SG No. 5	WTF
B-1-20	SG No. 3	WDF	NWFD

B. Air Emissions Monitoring Data

Hydrogen sulfide gas was flared at NPR-3 from November, 1992 to March of 1995 and an emissions survey was conducted in May 1994. The survey consisted of representative wells and tanks and the three H_2S flares. Effluent samples were collected and analyzed for C1-C10, BTEX and H_2S. Much of the data collected was used to prepare the Title V permit application submitted to WYDEQ in September of 1995.

Sampling of ambient H_2S concentrations at the facilities was conducted monthly. The ambient readings were taken using a Jerome 631-X H_2S analyzer at points around the batteries which were relative to those used for sampling prior to flare installation. The H_2S concentration was measured using detector tubes. Table 5 presents the ranges of readings from half-hour averages which were performed at each battery at the sample point with the highest concentration. The data indicates that H_2S concentrations were well within DEQ specifications.

Table 5
H_2S 30-Minute Data Ranges

Location	$\mu g/m^3$	ppm
T-5-3	0.0 to 29.82	0.0 to .021
T-5-10	0.0 to 11.36	0.0 to .008
B-3-3	0.0 to 24.14	0.0 to .017
WYDEQ Standard:	70 $\mu g/m^3$ not to be exceeded more than twice/year 40 $\mu g/m^3$ not to be exceeded more than twice/5 days	
OSHA Standard:	10 ppm (14,200 $\mu g/m^3$) time-weighted average for 10 hours	

Annual Air Emissions reported to WYDEQ are listed according to pollutant and quantity in Table 6. This information is used to determine the impact of NPR-3 operations on air quality, the cost of air emissions, and in TRI reporting.

The WYDEQ does not require annual stack testing unless specifically stated in the operating permit for the facility. Therefore, after the initial stack test requirement following the first 90 days of operation, stack testing is limited to a preventive maintenance confirmation program or for the collection of specific information as determined by the regulating official. Operating permits are also not required for the H_2S flares.

Table 6
Air Emissions Inventory 1996

Emissions (lbs/yr.)				
Parameter	**Potential Emissions**		**Actual Emissions**	
	(lb/hr)	(tpy)	(lb/hr)	(tpy)
Particulate	5.8	25.6	3.74	14.6
SO_2	5.49	24.0	0.82	3.6
NOx	54.0	236.5	7.83	16.98
CO	72.5	317.6	1.74	3.32
H_2S	N/A	N/A	53.2	233
VOC	N/A	N/A	210.2	887.9
HAP's				
Benzene	N/A	N/A	1.45	6.35
Toluene	N/A	N/A	1.79	7.86
Ethyl Benzene	N/A	N/A	1.73	7.58
Naphthalene	N/A	N/A	0.17	0.72
o,m,p-Xylene	N/A	N/A	2.12	9.23

C. Continuous Release Reporting

Hazardous substances are stored throughout NPR-3 in small quantities to support operations. In most cases, substances are maintained at individual sites in quantities less than a reportable quantity (RQ). During 1997, there were no spills or leaks reportable under CERCLA.

D. Environmental Occurrences

During 1997, a one spill/leak was reportable to the Wyoming Department of Environmental Quality and triggered a DOE occurrence report. The following is a description of the occurrence.

DATE: 03/10/97
LOCATION: T-1-20 Shipping Line
DOE OCCURRENCE RPT. NO.: 1997-0001
REPORTED TO: WYOGCC - 03/10/97
WYDEQ - 03/10/97
DOE - 03/10/97

DESCRIPTION: A leak in the shipping line due to corrosion caused the spill.

CORRECTIVE ACTION: Hot water was used to move the spilled oil and produced water into a washdown pit constructed on location. A berm already in place prevented the oil & waster from migrating. The oil was recovered and recycled into the production stream.

VII. Groundwater Monitoring and Protection

A. Groundwater Monitoring Information

Permitted water disposal wells are used to dispose of produced and waste waters which do not meet discharge requirements. No significant shallow, fresh water zones have been detected in the 500 or more wells drilled since 1976. Casing and cementing plans are designed to prevent migration of fluids between zones. Injection wells are tested every five years to assure the integrity of the casing and to detect migration of fluids.

B. Groundwater Protection

The use of groundwater in northeastern Natrona County (NPR-3) is very limited because of poor water quality (high total dissolved solids) and the lack of significant water-bearing units. Ground water is used mainly for non-potable supplies. Where no better source is available at isolated ranches, the ground water is utilized for household and stock watering uses.

Potable water for the communities of Midwest and Edgerton (6 miles or 10 km north of NPR-3) is obtained from the water treatment facilities in Casper Wyoming and piped 40 miles (64 km) to these communities. There is no source of potable water underlying NPR-3. The only two formations at NPR-3 which produce water of reasonable quality for livestock use are the Tensleep and Madison formations. Water from both formations is produced and used in NPR-3 operations and is discharged through NPDES permitted facilities.

Various controls are used at NPR-3 to prevent fluid migration between subsurface formations. These controls include WYOGCC-approved practices and compliance with the Underground Injection Control (UIC) regulations. Production wells are cased and cemented according to WYOGCC rules and regulations to prevent fluid migration and if abandoned are permanently plugged. Injection wells are tested periodically for casing integrity to assure that injected fluids enter the proper geologic unit and that leaks are not occurring.

Aquifer exemptions and permits for underground disposal of water require the submittal of a variety of information. This includes descriptions of the nature and source of water to be injected, estimated minimum and maximum amounts of water to be injected daily, average and maximum disposal pressures, details of well construction, and a description of other wells within a quarter-mile radius that penetrate into or through the formation used for disposal.

Solid waste disposal operations at NPR-3 are unlikely to be pollution sources for either soil or ground water. Geologically, the absence of shallow groundwater, the presence of relatively impermeable weathered shale and bentonite at the surface prevent contaminant transport. The semiarid climate and the immobility of wastes allowed in the permitted landfill greatly reduce this possibility.

There are five monitoring wells at the industrial landfill to detect contamination of groundwater emanating from the solid waste facility. Following WYDEQ requirements specific to the NPR-3 landfill, four (4) of these wells were sampled in 1997. The permit renewal contains a permit condition which will require a new monitoring well and the replacement of three existing wells. The results of the 1997 sampling are summarized in Table 7.

Other groundwater protection controls include: general good housekeeping and the practice of using production chemicals in small quantities away from water ways; oil and gas production is handled in vessels above ground in diked areas designed to hold spills; underground storage tanks for diesel and gasoline are cathodically protected and pressurized lines have leak detector valves.

An exemption from the DOE Order 5400.1 requirement of full sitewide groundwater monitoring has been obtained for operations at NPR-3. Due to the low risk of contamination from the operations, sitewide monitoring is not be necessary. Monitoring continues at the solid waste disposal facility.

Table 7
1996 Landfill Groundwater Monitoring Results

Parameters	78-55-X-4	87-63-X-4	17-33-X-3	17-32-X-3
Major Ions mg/L				
Calcium	485	465	352	76.0
Magnesium	2635	2481	182	49.2
Chloride	101	140	704	241
Ammonia (as N)	0.11	9.28	3.40	4.11
Non-Metals				
Total Dissolved Solids (TDS)	44,200	63,200	30,400	12,800
pH	7.26	7.44	7.38	7.47
Hardness (grn/gal)	705	665	95.2	22.9
Total Organic Carbon (TOC)	32.0	28.0	30.0	12.0
Trace Metals (mg/l)				
Iron	<0.05	<0.05	<0.05	<0.05

VII. Quality Assurance

Procedures are available which detail the proper method of ground water, surface water, and NPDES sampling according to EPA-established protocol. These procedures include proper well purging technique, decontamination technique, test measurements, (pH, conductivity, etc.), personnel protective equipment, etc. Field equipment is calibrated to known standards each time it is used.

Laboratory analyses are performed by EPA-certified laboratories which utilize EPA approved methods and maintain QA/QC programs. Although EPA certifies laboratories for drinking water analysis only, this certification should reasonably qualify a laboratory for wastewater or RCRA waste analysis because detection of drinking water contaminants requires greater precision than do most wastewater or RCRA waste analyses. Laboratories which have shown themselves to be poor in quality control have been eliminated from use. Blind blank samples, usually distilled water, are sent in with other regularly collected samples.

Subcontracts for laboratory analysis are conducted for NPR-3 activities. NPR-3 does not maintain an EPA-approved lab; therefore, inter-laboratory cross-check programs are not conducted.

Fluor Daniel maintains a formal Quality Assurance Program which includes quality assurance requirements for records management and other standards relating to environmental tasks.